

REMARKS

The Official Action of July 16, 2003, and the prior art cited and applied upon therein have been carefully reviewed. The claims in the application are now claims 1-12 and 31-44, and these claims define patentable subject matter warranting their allowance. Accordingly, the present applicants respectfully request favorable reconsideration and allowance.

The Office Action contains an error in paragraph 13, particularly subparagraph 3 of paragraph 13(a). The present application is not the U.S. national phase of a PCT application. Applicants filed a certified copy of the Japanese priority application with the present application on June 12, 2001. Applicants respectfully request the PTO to correct the record and to acknowledge receipt of applicants' papers filed under §119 through a priority claim and the filing of a certified copy of the priority document.

New claims 31-43 have been added. These claims are patentable for the same reasons as the other pending claims, for reasons pointed out below in response to the prior art rejections.

Applicants wish to raise a complaint. A restriction requirement was made without giving any reasons why the groups were considered distinct or why they were separately classified. This was pointed out in applicants' Reply filed May 1, 2003. Not only did the applicants not receive an explanation, but the Office Action of July 16, 2003, does not even address the restriction requirement. The MPEP is clear that when an applicant presents an argument, the PTO is supposed to respond, and indeed answer or rebut the applicant's argument. This the PTO did not do in the Office Action of July 16, 2003.

Moreover, such Office Action does not even repeat and make final such a restriction requirement. The non-elected claims were simply not examined. No statement was provided at all that they were even withdrawn, but applicants must assume they were withdrawn because they were not examined. Again, applicants submit that this is not proper procedure on the part of the PTO.

Nevertheless, as it is **implied** from the Office Action that the restriction requirement has been maintained for reasons unknown to applicants, the applicants have now accepted the restriction requirement and have canceled the non-elected claims without prejudice to the present invention and without prejudice to applicants' rights under §§121, 120

and 119, the applicants reserving the right to proceed with a divisional application without any penalty whatsoever.

Applicants have amended their Abstract as requested by the examiner.

Claims 7 and 11 have been rejected under the second paragraph of §112. The rejection is respectfully traversed.

Applicants believe that the claims as previously drafted, particularly considered in light of applicants' specification (fully consistent with law), would not have been confusing to those skilled in the art, and therefore the claims in their previous form are fully in accordance with §112. At **worst**, claim 7 in its previous form might be considered objectionable, but **only** as to form.

Nevertheless, in deference to the examiner's views and to avoid or minimize needless argument, some cosmetic amendments have been introduced into claim 7, which amendments carry over to claim 11. Such amendments are of a formal nature only, i.e. made to place the claims in better form consistent with the examiner's understanding of what is desirable under U.S. practice. Such amendments are not "narrowing" amendments because the scope of the claims has not been reduced. No limitations have been added and none are intended; the meaning of the claims remains the same.

More particularly, as the word "vacancy" might be considered non-idiomatic in the context of claim 7, the term "vacancy" has been deleted and has been replaced with "cavity or bore". An embodiment consistent with claim 7 is disclosed in Fig. 6 and is described in the specification in at least two locations including page 16, lines 19-22, and in more detail in the top paragraph on page 17 commencing with line 3 which describes Fig. 6. In the embodiment of Fig. 6, encompassed by claim 7, the laser is controlled so as to focus the laser beam on an inside portion of the bubble-bearing glass substrate; this forms a cavity or "vacancy" (in the form of a "bore" in Fig. 6) entirely inside (within) the glass substrate.

Withdrawal of the rejection is respectfully requested.

Applicant notes that claims 7 and 11 have not been rejected on the basis of any prior art. Accordingly, applicants understand that these claims are deemed by the PTO to define novel and unobvious subject matter under §§102 and 103, and applicants are proceeding in reliance thereof.

Claims 1, 2, 8-10 and 12 have been rejected under §102 as anticipated by Tumminelli et al USP 5,196,041 (Tumminelli). This rejection is respectfully traversed.

A key feature of the present invention is to use a glass substrate which contains air bubbles. The advantages of doing so are outlined in substantial detail in applicants' specification, and very substantial improvements are achieved according to the present invention.

Accordingly, the use of a glass substrate containing discrete air bubbles is extremely important. Because of such a feature, when a laser beam is irradiated to the bubble-bearing glass substrate, minute cracks successively arise between minute bubbles in the glass substrate along the direction of the laser irradiation by a thermal machining laser. The successive generation of the minute cracks prevents or suppresses the formation of an upheaval or taper at a machined portion of the glass substrate.

The feature of providing a glass substrate containing bubbles is simply not disclosed at all in Tumminelli, contrary to what is stated in the rejection. Tumminelli simply does not disclose or use a glass substrate containing bubbles, and does not include the feature of "controlling an amount of air bubbles in said glass substrate" as called for in applicants' claim 1.

Instead, Tumminelli discloses a machining method for forming an optical channel wave guide on a waveguide layer made of a porous doped silica deposited on a substrate. The

material machined or worked is not a bubble-bearing glass substrate but is "a porous doped silica" in Tumminelli. The porous doped silica of Tumminelli is far different from the bubble-bearing glass of the present invention. The porous silica of Tumminelli corresponds to a film or membrane of glass having porosity, and is essentially different from the bubble-bearing glass in which plurality of bubbles are included therein as defined in the present invention.

It should be clear that a porous doped silica is not the same as, or even similar to, a glass substrate containing discrete air bubbles. Accordingly, Tumminelli does not anticipate any of applicants' claims.

Moreover, the focus of Tumminelli is to provide a waveguide having a more uniform index of refraction profile and this is achieved by the use of the porous doped silica.

While Tumminelli has not been applied under §103 by itself, applicants point out that there is nothing in the prior art to suggest the substitution of a glass substrate containing discrete air bubbles for the porous doped silica of Tumminelli. Indeed, the porous doped silica of Tumminelli is the key feature in Tumminelli, and to replace it with something else would to fly in the face of Tumminelli, and that could not have been obvious.

Moreover, it is clear simply from looking at the drawing of Tumminelli, and especially Figs. 5 and 10, that the very problem which the present invention overcomes is inherent in Tumminelli.

Applicants respectfully request withdrawal of the rejection.

Claims 3-6 have been rejected as obvious under §103 from Tumminelli in view of Umetsu et al USP 6,563,079 (Umetsu). This rejection is respectfully traversed.

First, Umetsu has not been cited for the purpose of overcoming the deficiencies of Tumminelli as pointed out above, and indeed does not do so. Therefore, even if the combination were obvious as proposed in the rejection, not at all conceded, the resultant reconstruction of Tumminelli in view of Umetsu would not correspond to the subject matter of claims 3-6, which depend from and thus incorporate all the subject matter of claim 1.

It may be additionally pointed out that Umetsu relates to a process for forming a hole in a silicon (Si) layer, and cannot be applied to glass substrate machining. This is because the Umetsu method utilizes or relies on a crystallization of Si. Glass, on the other hand, is an amorphous material and cannot be crystallized. One skilled in the art would not be inclined to even attempt to combine

Appln. No. 09/878,265
Amd. dated October 16, 2003
Reply to Office Action of July 16, 2003

Tumminelli and Umetsu, and certainly not to carry out glass
(an amorphous material) machining in view of Umetsu.

Withdrawal of the rejection is in order and is
respectfully requested.

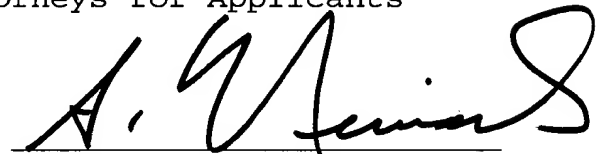
The prior art documents made of record and not
applied upon have been noted, along with the implication that
such documents are deemed by the PTO to be insufficiently
pertinent to warrant their application against any of
applicants' claims.

Applicants respectfully request favorable
reconsideration and allowance.

Respectfully submitted,

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